



Design of electronic information

by W. Bender
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We experience both qualitative and quantitative aspects of information. The design of electronic information involves a search for a common ground between the quantitative description of information and its qualitative expression. In searching for this common ground, at issue is not only what one designs, but how one designs, what happens to the design after it is conceptualized, how users interact with the design, and what effect the design may have on society.

Design research at MIT

Ivan Sutherland introduced computer-aided design (CAD) to the MIT community with his Sketchpad project in the mid-1960s. Subsequently, an architecture student, Nicholas Negroponte, began applying CAD to architectural design. He soon discovered that computer-aided design was somewhat of a misnomer. While the computer was useful for drafting, that is, making angles right and circles round, it was incapable of participating in design, e.g., the inspirational sketch done on a napkin at lunch. Creating tools for collaboration between the designer and the computer was a principal goal of Negroponte's Architecture Machine Group and its progeny, the Media Laboratory.

The late Muriel Cooper, cofounder of MIT's Visible Language Workshop, directed design research at the Media Lab. Over the years, Cooper attracted a diverse group of students to the Media Laboratory: computer scientists who applied artificial intelligence to graphics design, graphic designers who became superb programmers, and photographers who became versed in cognitive science. This heterogeneous collection of talents resulted in innovations such as dynamic typography, relational grammars applied to graphic design, design agents, and information landscapes.

The papers in this section

The first paper in this section reviews the many collaborations between Musgrave and Cooper. Their digital graphic design innovations include the application of dynamics, translucency, color, and antialiasing to typography, and the use of collage, animation, and computationally assisted layout in electronic document creation, all harbingers of desktop publishing.

One possible consequence of merging design and engineering is a more efficient design process. Another possible consequence is the creation of new solutions to traditional and emerging design problems. The combination of a newspaper and a computer flight simulator may well have resulted in a paper airplane, if left only in the hands of an engineer. The creation of information landscapes by Cooper, Small, and Ishizaki was a leap from static "flatland," the traditional design domain, to a three-dimensional dynamic world, where most of the traditional design rules are inadequate. Small describes this work as applied to the complete works of William Shakespeare.

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The computer gives the designer seemingly ever-expanding choices. While these design choices may lead to new degrees of freedom, these choices can be so overwhelming that most of the power of the machine remains ignored or unutilized. The next two papers examine the extent to which the computer can be tamed—the first by providing structure to the choices, the second by learning by example. Jacobson and Bender describe an objective model of color experience and its application to color communication based on the types of interactions between colors. The model adjusts formal compositional attributes and can be utilized to build a general architecture for adding guidance to interactive systems.

Lieberman and Maulsby explore instructible agents, agents that learn by example from the user. The synthesis of research fields such as artificial intelligence and human-computer interaction led to the current research. Two approaches discussed in their paper are direct instruction and inductive inference.

Messages are conveyed in many media, e.g., the printed word, the moving image, etc. The final paper in this section explores the theme of media transcoding, the transformation of a message expressed in one medium into its expression in another medium. Massey and Bender describe a system for transcoding between cinematography and photography. Unlike a photograph, which represents a discrete moment of time, a salient still reflects the aggregate of the temporal changes that occur in a moving image sequence. The salient still process is reviewed with an emphasis on its ability to preserve narrative expression.

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